

California Sierras in War Times

LESTER ROWNTREE

My little home hangs to a hill above the Pacific. For the back garden there is a mountain surfaced with the gray-green of artemisia brightened for most of the year by wild flowers. Fifty steps, flanked by California wild flowers and species plants from many countries, wind down to the drive below. Out of the front window of my study the dark boughs of Monterey pines make a floor for the wide stripe of ocean blending into the riband of fog which merges sky and water. Little fishing boats from Monterey still,—even in war time,—go down the coast in the evening and come back at dawn, all white in the water's light and dragging their dories behind them like newly born young.

The activities of last summer (which was to have been spent in the field) had to take new shape and, for once, I lived through the months with the fog and the barking seals and the red-tailed hawks hovering over the flower-spilled hillside; however, I was able to wangle a Sierra pack trip, short but full enough of impressions to supply happy memories for a rubber-bound 1943. The procedure of getting to the summer Sierra is always the same:—the Coast Range must be crossed, the hot Valley spanned and the first night spent in the yellow pine zone. Next morning the load is transferred from car to pack animal. The horses and mules patiently wait their turn, taking deep sighs as the cinches are tightened, watching the packers out of the corners of their eyes and ruminating on the length of their trip. The lookers-on, this year reduced to very few, pass banter and advice, wave an envious good-bye and the slow movement along the flower lined trail begins.

Blue lupins and red columbines and penstemons, rose-pink sidalceas and scarlet castillejas, yellow eriogonums, potentillas, mimulus and brodiaeas, and presently the bloom of diffusive *Phlox douglasii* smothering its stiff mats against the granite rocks. Then the sprawling *Arctostaphylos nevadensis* taking the place of *A. patula*, willing to tackle any obstruction, falling back only when the boulder is mammoth or the tree trunk tall, and without any effort or benefit of human hands accomplishing just the effect the rock gardener yearns for and cannot achieve. With it grows the huckleberry oak *Quercus vaccinifolia*, making with its small shining leaves, much the same distant impression on the landscape, and the low *holodiscus*, foamy-cream with bloom. Low *Delphinium decorum* var. *patens* in many colors paint the openings in the forests; *Calochortus leichtlinii* looks up as we pass. There is a dwarf *Allium campanulatum* in dry spots and tall *A. validum* among the taller *Lilium parvum* in wet ones. Now the creamy flowered snow brush, *Ceanothus cordulatus*, all feathery with bloom and, at the edges of dark brown pools, *Phyllodoce breweri* and *Ledums*, among whose foliage mosquitoes lie in wait for human ankles. The fragrance of monardella keeps pace with us, the wind blows in one's hair, the music of streams is constant in the ear and the old sense of freedom and release comes back again.

For obvious reasons, the Sierra section nearest to home had to be chosen; north of the haunts of *Aquilegia pubescens* and *Lilium parryi* but not far enough north for *Lutkea pectinata*, *Phyllodoce empetrififormis* and the *L. howelli* and *L. heckeri* groups of *Lewis-*

ias. This was a quick renewing of old and familiar acquaintances, with little chance of meeting the unusual.

On water that was recently snow the pads of *Nymphaea polysepala* lay basking in the sun and *Cassiope mertensiana* was just past blooming, the tiny meadows were alive with lovely grass of parnassus and shooting-stars and buttercups, *Kalmia polifolia* var. *microphylla* was covered with wide rosy saucers and the little streams which cut their ways through the mountain meadow were edged with squashy wads of *Gaultheria humifusa*. Low shad bushes were in full bloom as the first *Pinus contorta* var. *murrayana* and mountain hemlocks were reached. One look at the hemlocks told me which way the prevailing wind came from, for on that side the branches were short and stiff, while on the sheltered side they were long and feathery. Red firs and the silver pine, *P. monticola*, appeared together with the snow banks, the noisy Clark crows and the rosy finches. At the edges of melting snow banks, flattened, impatient heads of pale yellow eriogonums were rising from depressed pads of crowded silky foliage, despairing now but soon to become spirited plants alert with promises of abundant bloom. Like all other alpine, the eriogonums were hurrying to make the most of the short time at their disposal, putting on, in the rush of business, a show of brilliancy and opulence.

In this zone, about 9000 feet, I was dropped off. I set my little pup tent up on a flowery ledge close to an ancient tamarac pine above a lake. Into the tent went cameras, presses and books; the bed roll was spread not far off on a mattress of hemlock boughs. That first evening as I lay gloating, I counted seventeen different flower species and as darkness came on, listened to the sound of melted snow running

over granite (like the voice of a querulous woman), the soothing song sung by the wind in the conifers and the constant coughing, coughing of the lake below. When I opened my eyes next morning the fuchsia tints of penstemons, the lavenders and lilac of phloxes, the blues of alpine lupins and the yellows of dwarf mimulus were reaching for the slanting sunrise light. The calochortus in the chinks at the foot of my bed retired, I noticed, long before I did, and never got up until after I had breakfasted. A crevice behind me was crammed with the bright light green fronds of *Cryptogramma acrostichoides*. At the base of a rock at my side ran a silver line of *Pellea breweri* clothed in what the Royal Horticultural Society color chart calls chrysanthemum crimson, were flowers of *Rhodiola rosea* edged close to mats of *Erigeron compositus* starred with bloom, and all around me were the pervasive white pads of antennarias. Over to the right *Minulus lewisii*, together with that widely distributed little shrub, *Potentilla fruticosa*, were enjoying life in a shiny spot slithering with seepage, and over-beyond was the only salmon pink *Aquilegia formosa* I have ever seen. In the moisture at the base of wet rock cliffs, *Veratrum californicum* gathered in colonies, their classical shoots still partly folded, though those we had seen below had spread their majestic, ribbed leaves and shot their starred flower spikes.

A home-like feeling always comes after living in one mountain place for a few days. Only by repeated wanderings through the canyons and over slopes can one make them one's own, and only by lying in the same spot night after night, watching the approach of night and the day's dawning steal over rocks, water, trees and flowers, can one really come to know the mountains. In the moonlight a gran-



Lester Rowntree

Sorbus sitchensis in granite at edge of lake

1754



Lester Rowntree

Potentilla fruticosa in seepage over granite

1755



ite edge, painted purple by seepage becomes illumined thistledown floating in a pearly aurora, and dark boughs of prostrate old evergreens take on life and character they never manifest by day.

The recumbent conifers are among the most imposing sights in the Sierra. Out of a hair line which splits the exposed granite comes a seedling *Tsuga mertensiana*, *Juniperus occidentalis* or tamarac pine, quite expecting to become a stalwart monarch of the mountains. Winds batter it and snow sits upon it and every attempt at the perpendicular is thwarted; yielding to the inevitable it finally travels sideways and gives itself up to the horizontal life. The branches hug the twisted and weathered old trunk close, the fresh growth of their young boughs showing in sharp contrast to the old bark, which has a smooth silky silverness beneath its seamed and shredding exterior. Sometimes it becomes a wheelshaped affair, quite flat, the distorted hub alone showing its years. Work your way across the dramatic snow-smoothed granite slabs where these antique dwarfs prolong their existence, over the steep shoulder and down the sheltered slides of broken stone, and you will find all three of these conifers erect and invincible, their roots deeply anchored in loose humus and rock, and their trunks shielded by the neighboring cliffs.

These fissures in the granite boulders provide happy places for sprouting seeds, for they are filled with the most

satisfactory mixture of humus and gravel. I watched the building up of this idea combination, the slow breaking of the thin veneer-like crust on the granite, and the mingling of its crumbling particles with bits of rotted wood, last year's cones and fallen leaves, all pulverized by winter. This perfect diet for alpenes filled the fissures and the first inhabitants moved in. Sometimes these form a living ribbon following the line, sometimes little groups of individuals such as three inch *Erysimum perenne* or perhaps a low and wide red-berried elder, *Sambucus racemosa* of the rather similar mountain ash, *Sorbus sitchensis*.

Everything up there seemed filled with exhilaration and levity. Humming birds made little swipes at my hair, flying off between thrusts and squeaking, "there now." Small groups of warblers fluttered from hemlock spire to pine top, apparently just for fun, and in the dusk as I am dozing off, a pair of foxes chased one another back and forth over the smooth rocks—quite oblivious to the human who lay within that still cocoon.

I came away feeling that I was just beginning to rediscover all there is to know about the mountains. But a war was on and there were things at home to be done, so I left my symphonic world, recrossed the Big Valley and, passing again over the Coast Range, returned to the fog and barking seals, the artichoke fields along the river's mouth and the telephone.

Seedlings of the Golden Rayed Lily

ALWYNE BUCKLEY

Eight years ago, with serious intentions, we embarked upon an adventure with the Auratum.

In another eight we hope to really know something about the species, but in the meantime we cannot refrain from comment upon certain facts that have already become evident.

We began with a three pound bag of seed from Japan and for several years added to the original supply from the same source. This year we harvested twelve pounds of our own seed and feel that we are nicely started upon our course as an independent North American unit. We have now a fair working knowledge of the fundamental problems that have to be dealt with.

At the outset we determined to put ourselves at the mercy of Nature and to work by "field culture," using no artificial heat. We have found the climate rather ideal for our purpose inasmuch as on the one hand the lilies do survive and thrive, on the other it provides plenty of difficulty so that the law of survival will unquestionably yield to us a bulb of sufficient stamina to stand up to anything within reason.

For example, at the present moment we are being visited, for the second winter in succession by zero weather without snow. Last year such weather put the frost down nine inches below the soil surface and every bulb on the place was definitely encased in frozen earth.

Our fall germinated seedlings, bulb-lets the size of a pinhead that have never seen the light of day—for their blades are not due until spring—lie an inch below the surface (except where the deer have kicked them or the pheasants picked them to the top) and over this is spread an inch of peat mull. We expect survival.

Our first costly lesson was that excessive coverage induced winter growth that did not survive. The *Platyphyllum* is the worst offender in this undue eagerness for self expression. It starts to grow at such a low temperature in both the bulblet and seed stage that our first pound of seed gave us 150 flowering bulbs and our second pound exactly none.

How this can be the case with a bulb of southern origin we leave to other inquirers, but since about sixteen hundred seeds go to the ounce we contented ourselves by retaining a half dozen bulbs bearing evident adjustment qualities and of such comparative earliness of bloom and seed maturing as to bring them within the scope of what I might call our natural season and be on hand for possible cross pollination.

However, we have such fine foliage on some of our Auratums, and even a typical *platyphyllum* bloom on an Auratum plant, that there does not appear much to gain from it. The range of color in the blooms seems quite limited and to our taste the flower seems coarse and canvaslike, without true substance.

If the *platyphyllum* on the one hand has gifts to offer from its Southern domain one might expect in like manner, certain other modifications in the northern extreme of its natural habitat. And this we find to be the case. Bailey refers to an alpine form of Auratum under the name of *Tashiroi*, and Wada has called our attention to an Alpine that he has called *Praecox*; whether these are the same or not we do not know, but in spite of various disappointments we have succeeded in acquiring two small stocks of the latter.

These appear to us to be of outstanding possibility, for the florist, the lily



Seedbeds in winter at "Esperanza"

lover and for blood strains to infuse into late forms of desirable beauty. After a journey across the continent and a late planting, one of our groups had its earliest representatives in flower ten days before any of our own seedlings. Wada has it flowering with the *japonicum* six weeks earlier than this, so ours may do much better yet. We note that in every case the stems are thinner, the leaves smaller, the height less, but although some showed a corresponding miniature flower, many were as big as the normal *auratum* blooms and showed similar variations in structure. Turning now from the extreme forms to what we might call the main group of *auratum*s we find that in our particular locality of the Fraser Valley of British Columbia, the flowering period of such seedlings as we have acquired starts about July 25th, reaches its height about August 10th and the last flowers come into bloom at the end of October. Propagating from our own stock the natural selection should terminate this season in plenty of time for good pollination and the maturing

of the seed. We have set this date as the end of August and a flower must have very outstanding qualities to urge its retention after that date. It is during August that visitors have remarked that the perfume could be noticed a mile away.

Now an output of ten thousand flowering bulbs a year is small from the wholesale point of view but it becomes tremendously confusing in making an attempt to catalogue the faces presented to one for daily inspection during this roundup, tags and notebook in hand.

Study of the available literature yielded record of just eleven variations and we anticipated the possible visit of some of these in our stocks; there were *Crimson Queen* and *Tricolor* on the *platyphyllum* side; Woodcock and Coutts recorded an example of *flore pleno*, made bare references to *cruentum*, dismissed *rubrum* as not in cultivation and accorded a similar fate to the *Parkmanii* of southern extraction. Bailey had a *rubropictum* which corresponded with someone else's *rubro-*



The pure Chalice type

vittatum; there remained *Wittei* and *Virginale* that various authorities seemed confused about, the same applying to *rubro-vittatum* and *pictum*.

Armed with this questionable information the writer eagerly searched among the first season's blooming and could have picked a round dozen different types that corresponded to each of the vague descriptions!

It took three years before order loomed out of bewilderment in the writer's mind concerning them, but the feeling of awe and reverence to the creator that was and is yet his companion when on these morning journeys he goes to greet the newest arrivals can perhaps be best supplied from the lips of an amazed and dear old lady visiting the garden, who quoted the Nature Spirit in Faust:

"Still in the silent loom of Time
I ply

And weave for God the robe thou
see'st Him by!"

Form after form is presented in the

swift succession of the season with few duplications and these forms have yearly been banked up in our stocks to the point where we were forced to single out and "clone" four hundred distinct and worthwhile variations!

No wonder the various illustrations we found, (even those being omitted which obviously were suffering from virus!) were all different! But why no comment on the dissimilarities? What is a standard "*auratum*?" why such careless disregard of such ineffable beauty? We cannot say. . . . We only know that we seem to find ourselves in a unique position; with a plantation sufficient to afford a range of comparisons that does not exist outside of the Orient, and — with a pleasurable but heavy duty to perform.

As our powers of observation increased we approached the problem with more assurance and divided it into a number of smaller ones. Dealing with the structural details first, we start with the bloom. We have by careful

photography recorded eight distinct types; the typical archelirion and seven variants.

The pure CHALICE type has a high, wide shouldered bud, each side often measuring two and one-half inches in width with an average length of eight inches; this, of course, makes a wide sepal in the opening flower, and the stiff angle therein—to which the petal conforms — together with the heavy substance of the type, gives a definite chalice shape; an inturn before the outward reflex.

Far surpassing this in structural beauty is one we have ventured to call the ESPERANZA type; this has a narrow bud usually nine inches or more long. The petals are of such great width as to overlap and entirely conceal the nectaries of the sepals, the length of both petals and sepals enables them to make a complete turn on their axis so that the tips face one again in spite of the long reflex. Both are wavy and the flower is wide open.

The STAR type has also the long narrow bud, but being more rigid, the flower is a perfect hexagon, moderately reflexed and the immense open flower about seventeen inches from point to point.

The WINDMILL type shares the rigidity of the star type but has short and very wide petals and an open flower.

The SPIDER type has the chalice form in comparative skeleton, the petals and sepals narrow and excessively fluted and waved, with daylight visible between all members.

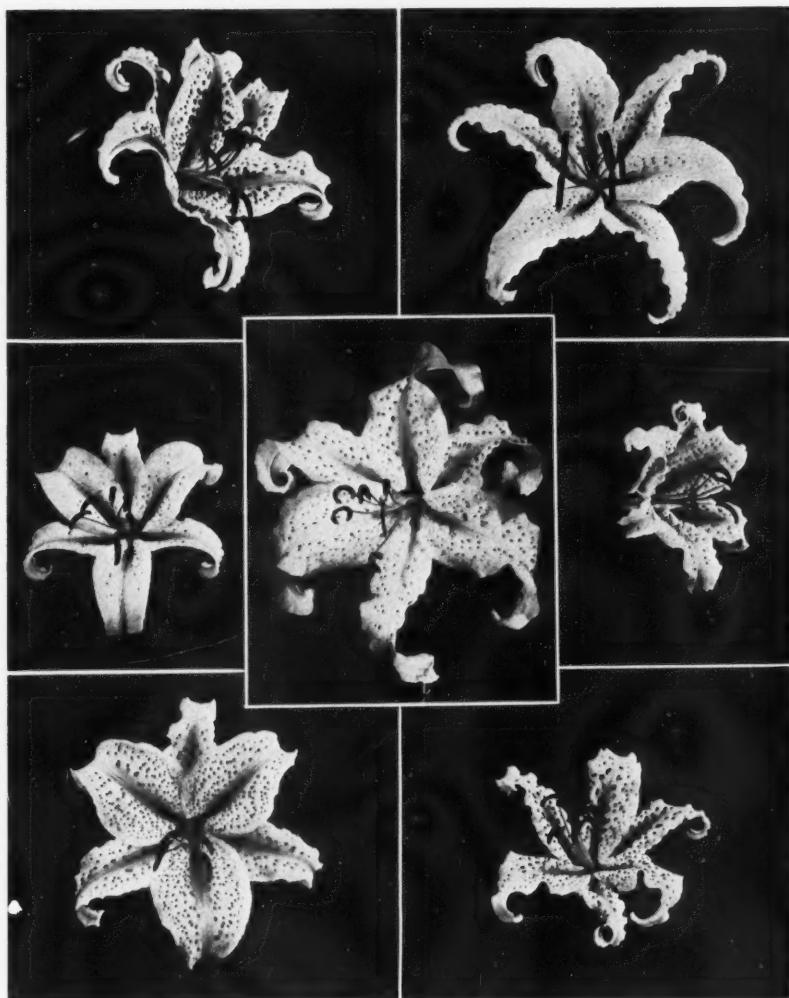
The MISSION BELL type has pendulous half open blooms.

The PANSY type has a closed throat but the flowers open so that the greater part of the surface is on one plane with the throat. It actually has a downturned bud, but the upper half of the

flower turns sharply upward whilst the other half maintains a downward course as in the bud.

Another very outstanding type we have called the ORCHID; it has a lingual conformation, either a petal taking the part of a lip and the sepal a standard or the reverse, the remaining members being symmetrically placed.

Other outstanding forms have not revealed themselves, though we shall be on the watch for them until the last of our original Japanese stock has flowered. Hybrids of these are not so appealing. Perhaps the next structural modification is the angle of the bloom—we have one upturned plant to date, and if it attains any great stature will be nothing but an oddity, but as compared to the downturned, the outward facing flower that looks straight in the beholders face seems by far preferable though quite rare. The grouping of the flowers on the panicle present a number of alternatives. 'Way off by itself in point of excellence seems to us the double-spurred type, for the flowering period is thrice as long as the normal. Of the two occupants of a given spur, the second flowers when the first is well over, and as this strain produces by no means a dense head each flower is well separated from its fellows and is large accordingly. There follow two other spur arrangements, the long spur providing the flower with plenty of room and the short spur forming a comparatively dense head. The head itself provides several arrangements; it may be upright and symmetrical with either a few flowers or even a mop-head which from personal prejudice we privately call the Idiot's Delight! This is the kind to brag about; you rush over to your neighbor to tell him that you have a lily with fifty-nine flower heads on it, only to be told that he has seventy-nine on his!



Upper row: Chalice type, Star type

Center: "Ivory" Orchid type, Esperanza type, Mission Bell type

Lower row: Windmill type, Spider type

This is not an example of fasciation but a normal type which can be depended upon for a yearly performance, but alas it is short spurred, rarely over five feet tall and has sacrificed quality for quantity and grace for redundancy. Only in one case have we had an upright spike of special grace and loveliness and that bore thirty-seven flowers on a seven foot stalk with long pedicels at the base, shortening as they ascended.

As a rule the reclining form with eight or ten flowers upon long pedicels seems Nature's finest offering; the individual blooms, well apart, reach the zenith of incomparable beauty displayed with the quintessence of taste and exclusiveness.

Except in shady places where a path must be preserved we have never had recourse to canes or similar support but there is a great range of "habit" running from the strong, seven-veined dark, lustrous foliage of massive proportions to the wiry black-stemmed type that bears pendant bells nodding in the breeze on long spurs suggesting a cluster of poised humming birds intrigued at some central cup of all-compelling honey.

We have had bulbs two and one-half pounds in weight and measuring nineteen inches around, whose stature did not exceed five feet and others that attain over ten, but owing to various circumstances we do not as a rule keep our bulbs intact long enough to really find the possibilities in height. Someone once wrote acknowledging a photograph of a very tall form with the perhaps natural enquiry "Upon what meat does this our Caesar feed that he hath grown so great?" but we find it a question of blood strain rather than diet.

The foregoing part of this article is but the foundation upon which—and we say it with all reverence and reflec-

tion—the glory of the Lord shall be revealed; and if we attempt to analyse that glory in its physical manifestations it is with the full consciousness of the inadequacy of words.

"Yon palpitating ray thou call'st a
rose —

Thou seest the light that in its
bosom glows;

But that which thrills behind it—
he alone

Who knows to commune with its
Maker, knows."

The mere members of a flower consist of three petals and sepals, six anthers and a pistil and the modifications may only be of form, of colour and the essentials in marking which consist of ray and papillae. In form the petal may be short, long, wide, narrow, severe, fluted, frilled and even fimbriated heavily at the throat after the manner of some *speciosum* and the papillae may range from the almost invisible to those that seem to have been half plucked from the petal with tweezers, the whole varying in quality from the scattered few to a couple of hundred on the petal. In size they may be up to an eighth inch in diameter, and may in turn be clustered at the throat or on the other hand mainly near the perimeter of the flower and vary in shape from circles to long strokes. As to the ray itself, it may be very narrow or on the other hand its color may extend with or without diffusion to within a quarter of an inch from the edge of the petal, and for finishing touch you may find petals lined upon their edges with color. In short, you may have little limit to the structural beauty with ornamentation akin to that of the illuminated manuscripts on whose adornment the monks of old spent their lives.

But the living colors baffle description. In our efforts to classify them we once purchased a spectral color chart,

but apart from the fact that it made no attempt to offer blends that did not lie contiguously within the circle, the attempt to portray living light with mere printers ink would cause a smile to the old masters of pigment. How much more impossible to paint the lily in words! We must content ourselves with trying to convey some impression of the feeling given by a few conspicuous types.

We might say, however, that there appears to be no color of the rainbow that is entirely absent in the *auratum* seedlings but the pure blue, for they run well into the violet in many shades of the markings. The following examples perhaps show some contrasts more easily portrayed by the written word.

SUNBURST—A green gold center exploding through the yellow and orange, clear to violet shades in the tips and the outer papillae.

STAR IN THE EAST—An immense white star seventeen inches from tip to tip, lightly sprinkled with grey violet.

LEOPARD—A sinuous form, marked very heavily with large, brown blotches.

DAWN—A pale yellow and white center flushed with pink on the reflex of the ray.

FOGARTY FEGAN—A white centered flower changing sharply to strong blood red in the outer half of its area.

VICTORY—A broad light yellow ray narrowing sharply at the tip which is clearly outlined with a crisp cherry red V. Tan stamens provide clear contrast.

MORSE—A deep gold rayed flower evenly and heavily emphasized from throat to tip with longitudinally placed dashes instead of the usual circular papillae.

SWAN—An almost pure white, but unlike Wittei or Virginal, giving the impression of the arched posture of the swan in motion.

WONDER—A glowing chalice of violet with gold shining through. Had the old Viennese glass workers seen this they would have drawn inspiration from it.

GREEN GOLD—Needs no further description.

VIOLET RAY—Narrow but heavy textured bells on a plant of great stature; an upward glance within reveals imposing large, deep violet papillae predominating.

DIMITY—A tall form with very large white dainty flowers besprinkled lightly with pale mauve spots and poised on long slim pedicels that seem invisible in the evening.

PHYLLIS—A large flower, pale centered, but the strong red on the front face of the petal tips make it one of the most outstanding beauties we have been privileged to see.

MOLTEN GOLD—Seems to have its gold ray flowing over most of the petal in a manner to make us hope for a pure gold form some day.

Such are a few conspicuous beauties of a great many, and whilst they have been described somewhat like a catalogue, the reader will perhaps pardon this. The aim has been to provide sharp contrasts in close proximity.

There seems no end to the galaxy of stars in the Golden-Rayed firmament. How have they all originated? What alien blood—if any—has infused their bright glories? The *speciosum*? maybe, and if so by accident of Nature, what might not be done by design?

Lacking the early *speciosum punctatum* with which to try a few experiments, several years ago we used the richest forms of our deepest colourings to cross wholesale onto a group of common stock.

The resulting two and one-half pounds of seed was sown separately and the bulblets transplanted last Spring from the seedbeds, will in a few years give us a good idea of what the influence might be of a richly coloured neighbour out in the wild state. What a history must be written in these varying forms of lilies that we have inherited! And who has eyes to read this palimpsest of the centuries?

As our seed-raised hosts have appeared upon this scene we have at least caught one hint of evolution in that the paler forms more usually are the first to flower, and these more gloriously adorned come into the pageant at a later and more impressive moment as if by a newer and better idea of Nature.

And who are the messengers at the marriage feast? Bees? Not ours, nor any others, we think. Our humming birds? No, these love the brilliance of the noon day sun and will very industriously cross out Chinese red *pumilum* with the Golden Gleam to our chagrin, but when the golden rayed lily comes they display no interest at all.

However, when evening comes and God walks in the garden, our lily is imbued with new lustre, the white is more white; the gold more gold and

if you will be still—and fortunate—and quickeyed—you shall see the lightning swift messengers, the night hawk moths, drawn by the beckoning petals and their fragrance, whispering and whirring in the attentive ears of listening hosts, their long tongues sipping the nectar created for them; their large and busy wings forming a vortex and whisking the pollen as they hang poised in the air within the flower's cup.

We have found their caterpillars feeding on the lesser fireweed, and a friend writes of them from Ontario, though few in number. Are these descendants of the messengers of the past from far Japan? how came they here?

Such problems are—fortunately for us, outside the range of this article, but having presented our story, may we be permitted our wonder how it is that this splendid thing, introduced to the Occident in 1862, has merited in our eyes only the beggarly description it has been accorded in our literature on the subject? Certainly a few forms have been accorded lip-service, but why no reference to the charms of hundreds of others? However we account for it we can definitely say that the seedlings are surely due and overdue for discovery.

Household Palms and Related Genera

O. F. COOK

(PART I)

Three genera, *Neanthe*, *Omanthe* and *Mauranthe*, from Guatemala and Costa Rica, are considered in this paper as household palms, qualified by tolerance of shade, dryness, and moderate temperatures to thrive as potted plants under ordinary living-room conditions. These genera and many related types in tropical America are members of the family group treated by earlier botanists as a single genus, *Chamaedorea*, but the forms now known are numerous and diverse, often confused with each other, and in need of special study. The name *Chamaedorea* has lost any definite meaning, except in relation to the original type in Venezuela.

How many members of the group may prove suitable for household cultivation, is far from being known, since only a few have been tested. To facilitate explorations and experiments, the distinguishing features of the various forms should be much better understood. During the last century several genera or subdivisions of *Chamaedorea* were proposed by Liebmann, Oersted and Wendland for Central American palms of this family, but were disregarded by later writers. Most of these genera were based on minute differences, with little relation to habits of growth or suitability for cultivation. Generic distinctions that are to facilitate field study need to be readily perceptible in the living plants.

Several of the *Chamaedorea* palms have been grown in conservatories in Europe and in the United States, or have had limited use as garden plants in California and in Florida. The first that are known to have been treated as house plants in the United States, instead of being grown in conservatories,

were a few individuals brought from Guatemala in 1902. These were supposed at first to represent *Chamaedorea elegans*, but later were recognized as a distinct species. Also a new generic designation proved necessary, and the species was described as *Neanthe bella*.

A notice of *Neanthe bella* as a household palm was published in *Science*, August 6, 1937, and an illustrated account in THE NATIONAL HORTICULTURAL MAGAZINE for January 1938, "A Diminutive Palm from Mayaland." Variations of *Neanthe* and different forms of parthenocarps obtained with pollen of the palms later designated as *Omanthe* and *Mauranthe*, were reported in the *Journal of Heredity* for March 1939, "*Neanthe* a Palm for Genetic Study."

The genus *Omanthe* was described as "A second household palm" in *Science* of September 29, 1939, but no illustrations have been published. It was found at San Jose, Costa Rica, in June 1903, planted in parks and dooryards. An offshoot was brought home and kept as a house plant with *Neanthe*, showing nearly the same tolerance of living-room conditions. The third genus, *Mauranthe*, is here recognized for the first time. The type of the genus is the palm collected in Mexico by Liebmann in 1841 and named by him *Chamaedorea lunata*, known from one of Liebmann's specimens in the U. S. National Herbarium. Descriptions of *lunata* were published later by Martius and Oersted. Our material came from Guatemala, from palms growing with *Neanthe* in mountain forests of Alta Vera Paz, where several visits were made from 1902 to 1914. In March and April 1922 the same species was found growing in abundance with *Neanthe bella* in the forests that cover the

Maya ruins at Uaxactun and Tikal, in the northern part of Peten.

The outstanding differences between *Mauranthe*, *Neanthe* and *Omanthe* are shown in figure 1, in the order of mention from left to right. A general similarity of foliage in the three genera is apparent, yet with effective contrasts in form, texture and color. Although these genera are not closely related to each other, they have obvious affinities with several less-known palms in Central America, and thus provide an outlook toward more effective classification of this neglected family.

The floral characters that usually are considered as separating genera need to be associated with differences of the trunks, leaves, and inflorescences, so that the genera can be recognized and remembered visually, rather than as names attaching primarily to floral definitions or diagrams. A group of plants like the *Chamaedorea*s is not opened to popular interest by logical analysis of historic definitions. Classification by floral differences is complicated not only by the sexes occurring on separate plants but also by the flowers of the two sexes being separately specialized, not merely by stamens or pistils being absent but by different structure throughout. The more outstanding generic divergences are shown now in one sex and now in the other. Thus in *Neanthe* the female flowers have a monopetalous corolla with valvate lobes, like the male flowers, while in *Omanthe* the petals are separate in both sexes, valvate in the male, broadly imbricate in the female.

The wealth of localized genera in the forest regions of Central and South America is remarkable, and also the diversity of specialized features, which may make it possible for many of the genera to be recognized readily. The geographic distribution of the family as a whole extends to Peru, Bolivia and

Brazil, but is sparingly represented in its southern range and does not reach the West Indies. Numerous kinds are known from Colombia, Panama, and Costa Rica, but not so many as from Guatemala and Mexico. The number of species to be classified may reach 200 or more. In Dahlgren's "Index of American Palms," 90 species of *Chamaedorea* are considered valid, while 142 specific names have been used.

CULTURAL VALUES IN HOUSE PLANTS

Although house plants have been recruited from many divisions of the Plant Kingdom, the palms are a notable extension of the series. The sentimental interest and decorative value of the palms have long been recognized, but only one species is used extensively. In Europe and America many millions of dollars are invested in growing the so-called "Kentia" palm for decorating churches, hotels and theaters. The commercial *Kentia*, whose botanical name is *Denea forsteriana*, comes from a single small island in the Southern Pacific Ocean, between Australia and New Zealand. It is a remarkable palm, specialized for cool, cloudy weather, thriving on the coast of California, but only languishing in the more tropical climate of Florida. Its early stages are not attractive, and it soon grows too large for household use. The foliage of young *Neanthe* palms is quite as graceful as that of the mature "Kentia," and remarkably similar, with flowering and fruiting as further attractions. Praising *Neanthe* as the queen of house plants may be premature, but at least it may be claimed that new possibilities of interest and attraction are opened among the related palms. Rooting "slips" of *Omanthe* in bottles of water is as feasible as with *Fuchsia* or "geranium," and may be as widely practiced.

Palms that can be kept with other house plants in town dwellings or in



Fig. 1. Three household palms, Maurandia, Nephrolepis, Oenanthia

farm homes have truly human values, apart from any commercial status that may be attained. More than any other plants, the graceful symmetrical palms symbolize the perennial luxuriance of the winterless tropical world. Decorating urban mansions contributes less to human satisfactions than enhancing rural life. Urban populations are perishable and temporary. Only farm people living in separate families represent "survival values."

Keeping house-plants is one of the innocent "sublimations" of the parental instincts, affording satisfactions for many people and worthy of being considered as a factor in domestic life, an element in the art of home-making. Women are supposed by ethnologists to have taken the first steps in plant cultivation, and often appear among primitive people to have the agricultural instincts more highly developed than the men. Even in tribes where the men have taken over the heavier labor of cutting and clearing the forest, the women still do all the work of planting, weeding and harvesting, and have the further responsibility of selecting and storing the seed for the next season.

Agriculture is an all-year interest in most of the tropical and subtropical countries, but in cold climates such satisfactions are denied in the winter months, except as exercised upon house-plants. Thus a racial function may be claimed for the house plants, in sustaining and developing the agricultural instincts. The social utility of plant-minded people is hardly to be questioned, nor the need of providing for a fuller development of such interest as a constructive factor in education and racial welfare.

The care required for house plants is much less exacting and burdensome than for animal pets, and the general return through the cultural interests may be much greater. Each of our

house plants, like our field crops, garden vegetables and fruit trees, had its original home or place of development, its natural background of existence. We need to be aware of the origin of our domesticated species, not only to understand the habits and behavior of the plants, but in order to follow with appreciation the course of human progress in the arts of civilization, developed through agriculture and plant domestication.

The house-plants, of course, are much less important than the food plants from the standpoint of subsistence, but not from the standpoint of interest in plant life, since the house-plants come much closer to us. Also the range of choice among house-plants is much wider, extending to many families not represented among the food crops.

Not only the food plants, but many of the ornamental and medicinal species have been domesticated among primitive people, and this is notably true in tropical America. One of the incipient domestications is that of the pacaya palm of eastern Guatemala, *Edanthe veracpacis*, a member of the *Chamaedorea* group, often planted or allowed to grow in gardens and coffee plantations in the district of Coban, for the sake of its edible male inflorescence, as described in THE NATIONAL HORTICULTURAL MAGAZINE for July 1939, "The Edible Pacaya Palm of Alta Vera Paz." The graceful leaves of the pacaya and other related palms are brought in from the forests for decorating churches and festivals. Much wider opportunities of seeing the palms in their native countries are in prospect. The opening of highways through Mexico and Central America doubtless will have a profound effect upon the nature and extent of our interest in the world of tropical plant life. No palms in other regions give better promise of increasing our household flora, nor could the



Fig. 2. *Neanthe elegans* and *Neanthe bella* (between). Leaf-sheaths and young inflorescence of *elegans*, natural size



Fig. 3. Neanthe bella, mature plants, at right old plants marcotting

search be made in more beautiful and interesting countries.

EXPERIENCE WITH HOUSEHOLD PALMS

The Guatemalan "dwarf" *Neanthe*, with its history of forty years of household cultivation, since 1902, is the only member of the palm order that can be certified on a basis of actual experience as completely adapted to living-room conditions, from having completed its entire life history as a house plant, flowering, pollinating, fruiting, seeding, germinating, and growing a new generation. Others have evidenced their ability to grow as house plants under the same conditions as *Neanthe* during the same period, though not flowering and fruiting as young plants, which seems to be a special habit of *Neanthe*. The flowering stage of *Mauranthe* has been reached, but with only one sex, so that seeds and seedlings have not been obtained from household plants. *Omanthe* has propagated readily from offshoots, and *Mauranthe* has fruited freely in greenhouses.

Many other palms have grown as house plants, but usually for only a few months or a few years, either from not remaining in good condition or from becoming too large to be kept in living rooms. The seedlings of many kinds of palms have simple, grass-like leaves, and do not become attractive as house plants until "character leaves" appear, and this may require three or four years. The seedlings of *Neanthe* are remarkable in having compound leaves with neatly tapered and curved pinnae, so that even the small plants, only a few weeks after germination, are very pleasing. The habit of precocious flowering presumably is connected with this structural anticipation of the adult leaf-form.

MARCOTTING OLD NEANTHE PALMS

The green, shining trunk of *Neanthe*, about half an inch in diameter, is an attractive feature at first, but becomes, after several years, a limiting factor in the use of a mature palm as a house plant. The trunk eventually grows so tall that the foliage receives little light from an ordinary window, and the effect is that of growing the plants in deep shade. The leaf blades do not show the normally spreading position, with the pinnae nearly horizontal, but are held more upright, so that the plant as a whole appears less graceful. An experiment of marcotting one of the original plants of *Neanthe* was tried by Mr. Albert W. Close, and proved entirely successful, so that the entire stock of older plants was then treated.

The process of marcotting is simple, merely wrapping a ball of sphagnum and burlap around the trunk, tying it on, and keeping it moist, as shown in figure 3. In a few months, after roots have begun to grow, the lower trunk can be cut away and the palm set in new soil. The first of these marcots, a palm more than forty years old, is behaving like a vigorous young plant, returning to its earlier habit of forming a graceful crown of spreading leaves.

TWO SPECIES OF NEANTHE DIFFER IN ADAPTATION

Not only the genera have adaptive differences, but species as well, and of a nature to affect their status as household palms. Thus the Mexican *Neanthe elegans* not only reaches a larger size than *Neanthe bella*, but grows more rapidly. The seedlings are closely alike in the early stages of development, but a tendency to longer petioles soon is apparent and becomes more pronounced with each new leaf, most of the *elegans* plants becoming open and

rangy, in striking contrast with the compact habit of *Neanthe bella*. Two rather long-stalked plants of *Neanthe elegans* are shown in figure 2 with a compact plant of *Neanthe bella* between.

Although these examples represent rather extreme cases, some individuals of *bella* being less compact and showing more resemblance to *elegans*, the contrasts usually are marked. The petioles of *bella* usually are not more than 6 to 8 inches long, those of *elegans* 10 to 20 inches, on plants raised in the same greenhouse and of nearly the same age, leaving little doubt that the groups are distinct. Characters that usually are apparent in *elegans* are the stronger trunk, attaining an inch in diameter, twice as thick as in *bella*, the thicker and more fibrous leaf-sheaths, and a purplish tinge of the inner surface near the base of the leaf-sheaths near the base, where the sheaths of *bella* are pure white. The thickness of the leaf-sheath near the base attains nearly 3 mm. in *elegans*, compared with one millimeter in *bella*. The lip of the leaf-sheath in *elegans* is bordered with white, and in early stages of development has a distinct antiligule or auricle, these features shown in natural size at the right of figure 2. Also the petiole and rachis of *elegans* have a more distinct pale green or white vitta at the back.

As a result of the tendency to larger leaves at an early stage of development in *Neanthe elegans*, the plants shown in figure 2 have only 6 or 7 leaves while the *bella* plant has 11 expanded leaves. The trunks of the *elegans* plants are 2 cm. to 2.5 cm. in diameter at base, the *bella* trunks 1 cm.

Another difference is the notably greater susceptibility of *elegans* to an infection of the older leaf-sheaths by a fungus mycelium forming black spots or marginal bands, some of the plants

having two or three sheaths so badly affected as to become unsightly. The occurrence of a mycelium was verified by Dr. W. W. Diehl of the Bureau of Plant Industry, but not identified. Similar spots sometimes are found on the leaf-sheaths of *Neanthe bella* but smaller, and the plants remain in better condition.

ECOLOGY OF HOUSEHOLD PALMS

For a palm to be well adapted to household cultivation a threefold tolerance is required, of shade, drought and cold, which members of the palm order seldom show in suitable combination. All of the palms that can live as undergrowth in tropical forests have tolerance of shade, but in most of them the leaves are thin and delicate in texture, unable to withstand exposure to the relatively dry air of living rooms. Even among palms of the *Chamaedorea* family, some are quite unsuited to household conditions, showing distress in a few days or even in a few hours after being brought from a greenhouse to a living-room.

That some of these Central American palms have special tolerance of dry air and low temperatures, may be ascribed to the fact that the mountain forests of Mexico and Central America are exposed to periods of drought so severe that the shaded forest vegetation is badly shrivelled. Also the elevated districts even within the Tropics, are visited in the winter season by periods of cold weather, sudden "northers" as in Texas, with frosty nights in the higher mountains, this may explain why *Neanthe* and some of the related Central American palms have been able to thrive in farm homes where temperatures may range from 40 to 80 degrees in a few hours.

Even in their native countries, the forest palms sometimes are tested by plantings in open places, where some of



Fig. 4. Omanthe costaricana, in city park, San Jose, Costa Rica, 1903

them thrive and others show little tolerance. The love of flowers and ornamental plants is general in Latin America, and attractive species from neighboring forests often are planted in gardens or kept as potted plants around porches or patios. Thus it frequently is possible for some of the small native palms to be seen by visitors in Central America without exploring the forests, which usually are remote from the travelled roads.

OMANTHE, A NEW TYPE AMONG HOUSE PLANTS

The *Omanthe* palm, in order to be appreciated, needs to be considered as a distinct horticultural type, different in form and habit of growth from any that has been available for household use. From its general appearance, an *Omanthe* plant might be associated with the bamboos, branching at the base, sending up offshoots, and forming a cluster of stems, as shown in figure 4, each of the stems bearing a few leaves, instead of producing a compact leaf-crown like a typical palm. *Omanthe* is not alone in this habit of forming clusters of stems like the bamboos. Many other *Chamaedorea* palms are "cespitose," and members of other families, including several palms that are planted frequently in tropical gardens or conservatories, most of them too large and requiring too much sunlight to thrive in living rooms. Some of the clustered kinds among the *Chamaedoreas* are smaller than *Omanthe*, and worthy of being tested as house plants.

Neanthe has the appearance of a typical palm in conveniently reduced proportions, and *Omanthe*, if viewed from this standpoint, may appear as a rather poor imitation, not likely to compete in popular favor. "Too lank and leggy" was one expression of such a comparison, referring to young plants of *Omanthe*, before any offshoots had developed.

The offshoots give the palm an appearance entirely different from *Neanthe*. The question is not of *Neanthe* being replaced by *Omanthe*, or of *Omanthe* being grown separately, but of appreciating the pleasing contrasts of the two palms which enhance the attractions of both.

Except that *Omanthe* produces offshoots, all of the vegetative features appear very similar to those of *Neanthe*, yet in closer comparison each feature shows differences, so that even small fragments would be distinguished readily, when carefully compared. The leaf-sheaths of *Omanthe* contain a fine but very tough fiber, even narrow shreds of the sheaths showing much resistance. The leaf-scar at the base of the sheath has only remote fiber pits, while the superior rim is distinct and smooth.

The inflorescences develop from the axils of the living leaves in *Neanthe*, while in *Omanthe* they develop from lower trunk-sections. The branches of the inflorescence are short and erect in *Neanthe*, while in *Omanthe* they are long and drooping. The genera agree in two primitive characters, the flowers of both sexes standing separately along the branches, and the branches exposed beyond the spathes at early stages in the development of the flowers, but do not share any of their specialized floral structures with each other. The flowers of *Omanthe* are notably less specialized, the petals not connate as in *Neanthe*, and the pistillode not expanded.

A marked feature of *Omanthe* is the shoulder-like thickening of the upper part of the ovary, filling the cavity of the female flower, while in *Neanthe* the pistil occupies only the lower part of the floral cavity. The male flowers of *Omanthe* are more similar to those of *Mauranthe*. The shriveled female petals of *Omanthe*, collected at the stage of flowering often show parallel longitudinal wrinkles, especially the thinner

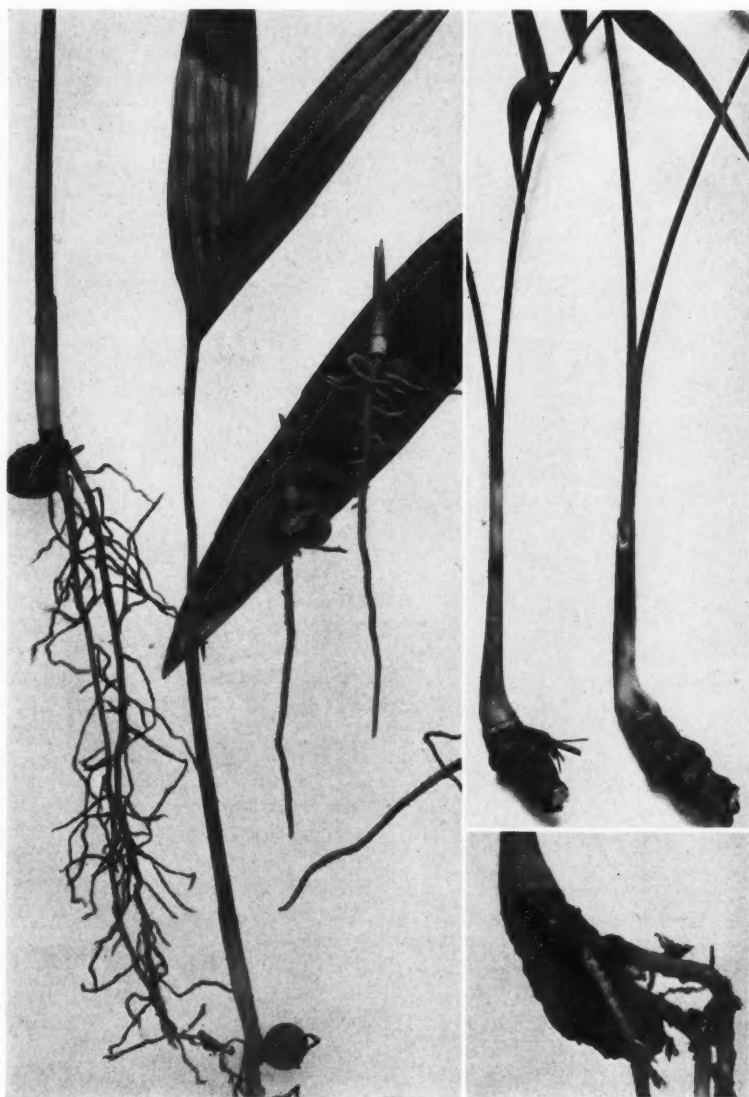


Fig. 5. Omanthe, seeds, seedlings and rooted offshoot, natural size

lateral segments that overlap in the bud. A sharp median ridge often is distinct, and a smaller ridge on each side of the thickened median section. The calyx is relatively thick and woody, the lower lobe, toward the base of the branch, often notably longer than the lateral lobes. In the male flowers also the lower calyx-lobe appears to be longer and narrower than the others.

FOLIAR FEATURES OF MAURANTHE

The slender long-jointed trunks, narrow tubular leaf-sheaths, infrafoliar inflorescences and open male flowers associate *Mauranthe* with *Omanthe*, but the specialized leaf-forms show several contrasting features. The leaves of *Mauranthe* are shorter and more compact than those of *Omanthe*, with about half the number of pinnae. Also the pinnae of *Mauranthe* are about twice as broad and obliquely oval in general shape, instead of lanceolate. The insertion of the pinnae on the rachis is broader in *Mauranthe* and notably unsymmetrical, with the lower section, below the midvein, about twice as wide as the upper section, while in *Omanthe* the vein is nearly in the middle, with the pulvinus more definitely restricted to the upper half of the base.

The midribs of the pinnae of *Mauranthe*, shown in figure 8, have a marked sigmoid curve, approaching the upper margin in the basal part of the pinna but closer to the lower margin in the terminal half of the pinna, so that the sections are less symmetrical than the leaf as a whole. The midvein and the rather strong submarginal veins are much more prominent on the lower side, and this is true also of the larger veins of the composite terminal pinna. These inferior veins suggest the possibility of the pinnae of *Mauranthe* and other palms with similar leaves being formed of two original segments, united in pairs.

The rachis or midrib of *Mauranthe* also differs notably from that of *Omanthe* in having on the underside a white median band, the so-called "vitta," shared with many related palms but almost completely suppressed in *Omanthe*, and only faintly indicated in *Neanthe bella*.

The thick firm texture of the pinnae in *Mauranthe* and the smooth polished surfaces are another feature clearly seen in figure 1, the adjacent leaf of *Omanthe* with the same illumination showing no highlights. The heavier texture and distinctive pattern of the foliage may be considered as giving *Mauranthe* somewhat more "character," or at least a more definite contrast with *Neanthe* in its foliage, although *Mauranthe* is like *Neanthe* in producing no offshoots. The shining surfaces of the pinnae and their more vivid green color contribute effectively in a group, and even apart from the other palms *Mauranthe* may find welcome. One of the plants grown from seeds brought home from Peten in 1922 was raised as a potted plant in an office of the Bureau of Plant Industry. A photograph dated March 28, 1933, shows a vigorous palm about four feet high, with four trunk-sections exposed and six well-developed leaves.

SIGMOID PINNAE AND ROOFED FLOWERS

The pinnae of *Mauranthe* are described as sigmoid, from having a double curve like the Greek letter S. This form of foliage is not confined to *Mauranthe* but is closely approximated in other palms. One of these, with a markedly different floral structure in the male sex is shown in figure 9, with comparisons of the floral structures of the two palms in natural size and enlargements in figure 10. The male flowers of *Mauranthe* have the petals free and separating widely at anthesis, while the other palm has the petals firmly

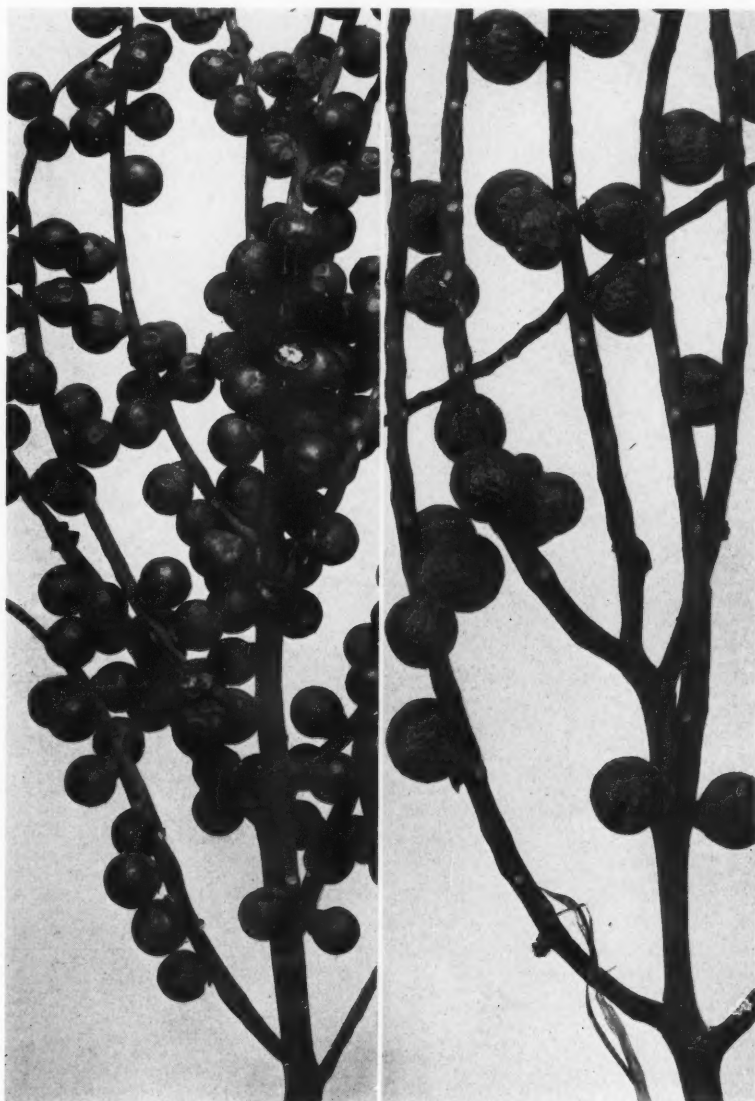


Fig. 6. Omanthe and Legnea fruits, natural size

united in the upper part, but the margins flared below the middle, forming a slit where the pollen sifts out. The petals do not separate, even when the flowers shrivel, as the photographs show.

For the palm with these roofed-over male flowers the name *Docanthe* is suggested, in allusion to the connate, costate petals. The Greek *dokos* is defined as a rafter or roof-beam, presumably cognate with Latin *togo*, German *dach* and English *thatch*. The calyx and corolla of the male flowers of *Docanthe* are of firm texture, strongly and regularly costate, yellow in life and scarcely discolored in drying, while in *Mauranthe* these organs are fleshy, pale greenish in the bud, promptly turning black as soon as the flowers open, corneous when dry and contorted, but with no indication of fibrous structure. The name *Mauranthe* refers to the dark color of the flowers, a deep dull purple, appearing black.

POLLEN SPECIALIZED IN MAURANTHE

The flowers of *Mauranthe* are peculiar also in being rather definitely adapted to insect pollination, in a manner not previously encountered among the palms. The pollen is papillose and coherent in masses, while in the closely similar genus *Docanthe* the pollen is smooth and dry, suited for sifting gradually from the chinks between the petals. The nature and extent of this specialization of the pollen in *Mauranthe* is shown in the enlargement of the fresh flowers to about 10 diameters in figure 12. Masses of the white pollen are seen adhering not only to the anthers, but to the dark surfaces of the petals and the pistillodes, not readily falling off. The male inflorescences dry in a few days, but may persist for weeks or months as pendent black-and-white tassels, an example of palm flowers as "everlastings." Adhesive pollen is known, of course, in the cotton plant and in many

others, but wind-pollination is the rule among palms.

CONTRASTS IN PEDUNCLES AND LEAF-SHEATHS

Two contrasting characters of the inflorescences are readily determined in mature plants. The inflorescences of *Docanthe* develop from the axils of living leaves, and have the basal joints narrow, thin and compressed, two to four times as long as broad, while the inflorescences of *Mauranthe* are definitely infraxillary and have very short basal joints, the first joint thick and indurated but very short and broad, nearly encircling the trunk. The peduncle as a whole tends to be longer in *Docanthe* than in *Mauranthe*, while the axis is shorter, as shown in figure 10.

The leaf-sheath of *Docanthe alba*, the type species, is white along the margin, as shown in figure 9, this to compare with figure 7, showing sheaths of *Mauranthe lunata*, with the margins concolorous. Also the margin is of thinner texture in *Docanthe*, and the mature leaf-sheaths become more deeply split than in *Mauranthe*. The petiole usually is distinctly grooved on the upper side in *Docanthe*, flat or convex in *Mauranthe*. Also the basal pulvinus of the petiole, white or pale green in *Docanthe*, is longer but less prominent than the deep green pulvinus of *Mauranthe*.

The pinnae are of somewhat thinner texture in *Docanthe*, lighter in color and the veins more prominent and transparent. Also the pinnae of *Docanthe* are somewhat narrower and not so strongly curved, with longer tips, more gradually tapering. The basal pinnae of *Docanthe* are spaced like the others, while in *Mauranthe* the lower four usually are much closer together than those above. The terminal pinnae of *Docanthe*, though reduced in length, usually are markedly broader than sub-

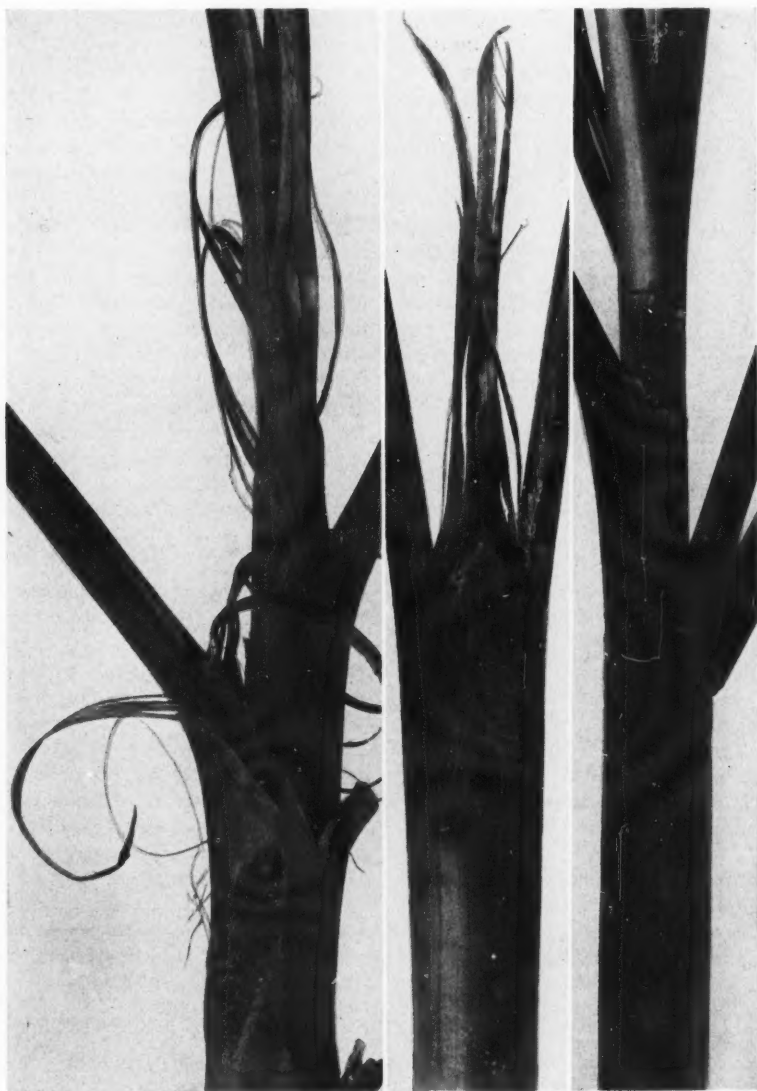


Fig. 7. Legnea and Mauranthe, leaf-sheaths, natural size

terminal, and as broad or broader than any of the others, while in *Mauranthe* the last pinnae usually are not as wide as some of the middle pinnae, and often are little wider than the preceding pair, sometimes not so wide. These differences of proportion are illustrated in figures 8 and 9.

At the fruiting stage other contrasts appear, as in figure 11. The fruits of *Docanthe* are strongly curved and colored yellow, while the fruits of *Mauranthe* are oblong and remain dark green during the period of development, turning dark purple and eventually black. A Mexican palm was named *Chamaedorea concolor* by Martius because the fruits were yellow like the spadix, and may belong to *Docanthe*. The berries are described as obovate, and the terminal pinnae as connate. The mesocarp of *Docanthe* is relatively thin, with a few fibers anastomosing in an open network, while the seed of *Mauranthe* has a rather firm coat of close, parallel fibers.

This genus *Docanthe* shares some of the characters of the male flowers with the original type of *Chamaedorea* from Venezuela, described by Jacquin in 1797 as *Borassus pinnatifrons*, and by Willenow in 1807 as *Chamaedorea gracilis*, but the South American palm has a different type of foliage, with broad, many-veined pinnae. The trunk is described and illustrated by Jacquin as an inch in diameter and rather short-jointed, the leaf-sheaths rather short and deeply split, the petiole very short, the female branches rather robust, often forked near the tip. The flowers are broadly prominent, set rather close, the fruits spherical, turning yellow or red, the size of a pea.

TAKING ACCOUNT OF PARALLEL LEAF-FORMS

The remarkably close similarity of *Mauranthe* and *Docanthe* is of horticultural

interest when it is noted that *Docanthe* has shown little promise as a house plant. Even in greenhouses *Docanthe* appears relatively short-lived, while *Mauranthe* remains vigorous for many years. Under household conditions *Mauranthe* seems more resistant than *Omanthe*, or even than *Neanthe*. The heavier texture of the foliage may render *Mauranthe* less susceptible to "red spiders," which attack many plants in the dry air of living-rooms. To have described *Mauranthe* as a new genus without considering at the same time the remarkably similar companion palm, growing in the same forests, might have led to confusion and disappointment, in the event of efforts being made to utilize *Mauranthe*.

The existence of genera so closely analogous is significant, not only as affording remarkable examples of parallel evolution, but as providing perspective in classification, letting us see that new distinctions are needed in exploring the evolution of this group of palms. A practical classification should make it possible for the different genera to be recognized readily in nature, so that familiarity with characters and habits may increase. For purposes of recognition in the field, characters of the vegetative parts are of primary interest, deserving much more attention than they have received in the taxonomic literature. Formal descriptions usually are drawn from herbarium specimens, rather than in the field or in the conservatory, with the living plants at hand.

Many features that render plants markedly different in nature are not represented in the parts that can be kept as pressed specimens. The flowers, of course, with their "essential organs," are the chief concern of the botanical collector, of palms as of other plants, but with many of the palms flowers may be present for only a few

days in the year, and may contribute very little to the naturalist's knowledge of plants in the field. The inflorescences are more persistent, and have many significant differences, entirely apart from the floral structures. Even with palms so nearly alike as *Mauranthe* and *Docanthe*, the basal joints of the peduncles are distinctive, in the manner described. The effort to provide logically contrasted definitions would account for the tendency to restrict generic descriptions to floral differences. The numbers of stamens and pistils served as primary distinctions under the Linnean "sexual system." The framing of floral characters has appeared as the chief interest in botanical classification, to the neglect of other features, many of which are as definitely specialized as the floral patterns. The palms remain little known, not for lack of distinctive characters, but because the differences are disregarded. As Goethe said, "we see only what we know."

PALM LEAVES FORMED IN CLOSED BUDS

A general reason for floral organs being more regular than leaves, in most of the families of plants, may be found in the fact that flowers generally are formed in closed buds, while leaves are developed from exposed buds. The palms in this respect are a marked exception, restricted to a single leaf-forming bud, permanently enclosed and protected. The overlapping cylindrical leaf-sheaths of palms are so tough and resistant to the internal pressure of growth that the emergence of the young leaves often is accomplished with difficulty. The flower-buds of many kinds of palms are exposed at much earlier stages of development than the young leaves, and this may be a factor in the floral diversity of the group.

The restriction to a single well-pro-

tected leaf-bud may have been a greater advantage in the early evolution of the palms, before the many competing types of forest vegetation were developed. Since all of the members of the palm order share this specialized habit of growing from a single terminal bud, it follows that all of the existing specializations of leaf-forms have been attained under these limiting conditions of closed buds. Compared with all the branching types of trees, the many kinds of palms appear so much alike that casual observers do not learn to distinguish them. Even such different kinds as dates, coconuts, royals, Washingtonias and palmettoes often are confused. In popular parlance, "Palms is palms."

It is remarkable that so many differences have arisen in the various groups of palms without destroying their general similarity. Of the palm order as a whole it may be said that the habits of growth and the patterns of foliage remain more alike than the floral structures, the fruits or the inflorescences. A specialized form of foliage like that of *Mauranthe* and *Docanthe* is no more to be disregarded as a generic distinction than a discrepancy of floral structure.

EVOLUTION THROUGH REDUCTION

A general tendency to smaller size and simpler structure may be predicated in a group of palms adapted to living as undergrowth in the permanent shade of tropical forests. As with many forest palms of other families, several members of the *Chamaedorea* group have their trunks reduced to small short-jointed, creeping rootstocks. Some of the trunkless palms resemble each other in so many ways as to leave no doubt of being related, while among other trunkless kinds no general similarity is apparent, showing that several parallel evolutions toward the trunkless state have occurred, and the same ap-



Fig. 8. Mauranthe lunata, leaf-blade and male inflorescence reduced



Fig. 9. Docanthe alba, leaf-blade and male inflorescence reduced, leaf-sheaths natural size

pears to be true of other features that are capable of being reduced or eliminated. Reduction of the trunk is accompanied in many cases by the leaves not developing beyond the juvenile form, with the simple V-shaped blades, but all of the simple-leaved forms are not related to each other.

The inflorescences are reduced in some of the genera to only a few branches, while in others all the branches are suppressed, leaving only a simple spike. Different stages of the re-

duction may be marked by the shortening of the peduncle, or the axis, or by the flowers standing closer together on the branches. In some of the genera all interfloral spaces have been eliminated, bringing the buds into contact as a complete pavement, an arrangement of the flowers described as "tesselate." The obvious advantage is that the buds have the protection of the spathes for a longer period. Some of the genera have enlarged spathes, especially in the male sex, notable in *Edanthe*.

(To be concluded)

Rhododendron Notes

CLEMENT GRAY BOWERS, *Editor*

Rhododendrons and Azaleas for the Midwest

In 1937 I was asked to visit a flower show in the nearby town of Hammond, Indiana. After viewing the show I was escorted to the home of the superintendent of schools to view an unusual garden. Indeed, this garden was unusual—here flourished such little seen plants as heather, *Kalmia*, *Buxus*, *Rhododendrons* and *Azaleas*.

The few secrets of the garden were readily revealed. The soil was a natural lake sand to which had been added peat moss, with some protection being afforded by placing the more tender subjects in the shelter of evergreens or of the house.

Following the thought-provoking visit to this garden my interest in these beautiful plants increased, with the question constantly in mind as to why these plants were neglected in the middle west. Was soil, climate, or some other factor responsible, or was it merely a case of lack of availability in local nurseries?

The soil for ericaceous plants must be acid. While much of the middle west is composed of clay, and glacial drift, yet there are places where other ericads flourish such as the region along Lake Michigan known as the duneland. Soil could be considered then as a local problem. This need not be too serious as extensive soil preparation is recommended for roses, lilies, and other plants, and in the case of azaleas a relatively shallow soil is all that is necessary, so that soil preparation need not be nearly as exacting as that for more common garden plants. A compilation of suggestions on soil indicated that a sandy soil to which had been added large

amounts of humus would be satisfactory. A further consideration was that the bed for these plants should be so constructed that there would be no lateral drainage of alkaline water into it. Prudence would indicate that the surface of the bed be higher than the surrounding soil, if indeed the whole bed is not created on the surface of the old.

Would the climate of the middle west support these plants? This question is one that could only be answered by an analysis of the conditions here with those elsewhere. Consequently the Weather Bureau was consulted for information on the climates prevailing at Boston to give an approximation of conditions at Arnold Arboretum, at Rochester for the conditions at Highland Park collection, and at several other points where rhododendrons and azaleas were being grown successfully. A careful analysis of the factors of climate at these points in comparison with that of Chicago, revealed that differences were so slight as to have no significant bearing on plant growth. Thus the lowest temperature at Boston was 18 degree below zero while the lowest at Chicago was 23. Five degrees would not make much difference in hardiness if the plants could withstand the subzero spells at Boston. Comparison of averages and means showed but little significant differences between Boston and Chicago. Thus the experience at Boston could be interpreted as a very good guide for Chicago with some allowances being made for such differences as exposure, culture, and the other un-

knowns that enter into all plant experimentation.

As a nucleus for a collection of ericads I purchased a selection of native species. This included *Rhododendron maximum*, *catawbiense*, and *carolinianum*, in the evergreen types, and *R. nudiflorum*, *vaseyi*, *calendulaceum*, *arborescens*, and *viscosum*.

The success of this original planting lead to the addition of other species particularly those listed as being hardy at Boston. The following species have been added from time to time: *R. catawbiense album*, *roseum elegans*, and Mrs. C. S. Sargent, *racemosum*, and *Wilsoni* in the true rhododendrons; and *R. canadense*, *Kaempferi*, *poukhanense*, *Yodogawa*, *mollis*, *japonicum*, *schlippenbachii*, *atlanticum*, and three hybrids each of *Kaempferi* and *mollis*, in the azalea group. These plants closely follow the recommendations of Dr. Bowers for New England and with few exceptions have proved reliable for this region. It seems probable that similar lists of hybrids should prove as good a guide as those of the species. The hybrids tested have all been of the hardier ones as listed by Dr. Bowers and the Arnold Arboretum.

The culture of these plants attempts to follow standard practice. The planting is on the north side of a porch which gives full shade during most of the year and partial shade during late spring and summer. The soil is a native sand which is very fine in texture. This has had sphagnum peat and oak leaves added. A mulch of about an inch of oak leaves is maintained. This depth could be increased except for the perennials being grown underneath which would be smothered. Water is supplied only when needed in the middle of drought conditions that may prevail during summer. Heavy waterings are made from a rain barrel while syringing is

done with the hose that carries lake water which is exceedingly alkaline. It seems quite likely that the conditions may be just a little too shady for the best development of some of the deciduous species and possibly one or two of the evergreen, however, no winter injury from sunburn has been noted even without any protection. While most of the fertilizing is done by the addition of oak leaves in the fall, yet occasional doses of magnesium sulphate are employed.

While I was first stimulated by the collection of Dr. Caldwell in Hammond, was his experience and mine unique or was there substantiating evidence that ericads could be handled successfully in this region? Arboretums in the region had no practical experiences to offer. Parks had not delved into the culture of these plants recently although there was some evidence that plantings had existed many years ago in some of the larger ones. The evidence that plantings had existed in some parks did not give any clue to the cultural methods employed or to the ultimate fate of the plants, whether they died from alkaline city water, or were removed as the landscape changed.

In visiting gardens about the city and suburbs specimens of rhododendrons and azaleas were encountered. Here are a few of the ones definitely seen.

Des Plaines, Ill. Three specimens of *R. maximum* growing on the Methodist Camp Grounds. Sent from Tennessee. Soil, alluvial loam. Condition fair.

Blue Island, Ill. Four *Rhododendron* hybrids in garden. Grown in partial shade of shrubs. Peat worked into sandy loam about the plants. Shaded in winter by burlap. Condition fair to excellent.

Hammond, Ind. Home of Dr. Caldwell. Soil is sand. Peatmoss has been added. Plants are in partial shade of shrubs or house. Condition excellent. With the exception of *R. Smirnowii* and some of the hybrids all of the species are duplicated in my collection and specific mention will be made later.

Chicago, Ill. Austin district. An *Azalea mollis* form and a hybrid rhododendron are being grown in a garden with only an occasional mulching of peat. No shade. Condition good.

Chicago, Ill. Beverly Hills district. Two plantings about a mile apart on Longwood Drive of *Rhododendron catawbiense*. One planting suffered from erosion and poor soil conditions, the other is in a shrub planting and apparently is in good condition. A planting of *Azalea mollis* forms also on Longwood Drive is doing all right. These are incorporated in a foundation planting with no special treatment. My collection is also in this region.

What is the specific reaction of the kinds so far observed? This is perhaps the most perplexing question and one that can only be partially answered as the extent of trial of these plants has not reached sufficient scope to be more than suggestive of some of the ones that have proved hardy and some that have not. While the failure of a particular species to do well within the limits of my observation may be indicative of a tenderness, yet it may merely indicate that the plant was individually susceptible and that others might prove satisfactory. Thus an adverse report should be taken as merely suggestive while a favorable report should be definitely interpreted as indicating excellent probabilities for cultivation in this region.

Following is a list of the species observed and tested with notes on their behavior:

Rhododendron with evergreen foliage.

R. maximum—completely hardy and satisfactory.

R. catawbiense — completely hardy and satisfactory.

R. carolinianum—completely hardy and satisfactory.

R. Wilsoni—The foliage and growth of this plant is good but so far it has not blossomed.

R. racemosum—severe winter-killing. Not hardy for this region.

R. catawbiense album — hardy and satisfactory.

R. roseum elegans—hardy and satisfactory.

R. Mrs. C. S. Sargent—hardy and satisfactory.

Rhododendrons—without evergreen foliage (*Azaleas*).

R. (Azalea) arborescens—hardy and satisfactory.

R. (Azalea) calendulaceum—Flower buds have been injured two of four years. Needs further trial.

R. (Azalea) nudiflorum—This plant was injured the first winter and has not completely recovered. This may be the result of transplanting and not tenderness.

R. (Azalea) Vaseyi — Very hardy and excellent in every way. The best.

R. (Azalea) viscosum—very hardy and dependable.

R. (Azalea) canadense—very hardy and dependable. Liked by rabbits.

R. (Azalea) poukhanense—hardy.

R. (Azalea) poukhanense Yodogawa—hardy.

R. (Azalea) japonicum—hardy.

R. (Azalea) Schlipenbachii—hardy.

R. (Azalea) atlanticum—Apparently hardy, results not based on long enough experience.

R. (Azalea) mollis — This species and some of its hybrids is hardy. The exact limits probably vary with each hybrid. J. C. VanTol and Altaclarence are satisfactory.

R. obtusum Kacmpferi — This species apparently needs protection as winter-killing frequently reduces the branches to the level of the mulch. This also shows in the variety Atalanta. Willy and Carmen passed out rather completely.

Rhododendron Smirnowii has proved hardy and desirable for Dr. Caldwell.

These lists should give a good selection for the beginner and indicate a few of the pitfalls to be found in selecting material from so large and extensive a group as these plants represent. Probably the native species would prove an excellent nucleus for most plantings with hybrids of close derivation receiving the next attention. Even though this list is small as compared with other parts of the country yet it embraces some of the most magnificent and desirable of the whole group.

ELDRED E. GREEN.

Rock Garden Notes

ROBERT C. MONCURE, *Editor*

PENSTEMONS IN OHIO

Many flower lovers who have travelled in the mountainous country of western North America no doubt retain in their mind's eye some of the beautiful penstemons seen there. They are to be found in valleys, on alpine meadows, on bleak mountains, and they vary in size from prostrate species, to those somewhat over three feet high. Their flowers are almost as varied as the colors of the rainbow, although orange and deep yellow seem to be missing. Probably the predominant colors are blue, violet and purple.

Although western penstemons generally grow in full sun, there are some that seek the shade. Some prefer damp meadows, others seem to thrive under rather arid conditions. Most of them, I have found do well in a very light stony soil. In fact when growing them in my garden, I try to avoid a rich soil, finding it tends to make them "leggy" and droopy.

One objection occasionally heard in regard to raising these western penstemons, is that they are rather short lived. It is true that many of them disappear after a year or two. But so do most columbines that grow in our garden: and yet we continue to raise them year after year.

There is another objection to growing these plants. In these central states, with alternate thawing and freezing during the winter, many penstemons which have roots that are fairly short and thick, tend to heave out on warm wintry days, and must be reinserted in the ground. Of course in their mountain homes, most of these plants are covered with snow throughout the winter, thus probably obviating the danger of heaving.

Anyone who has western penstemons in his garden probably knows how difficult it is to determine the specific names of his plants. There is, up to the present, no complete account of western penstemons. Dr. F. W. Pennell, who is probably the outstanding authority in this country on penstemons, has published a monograph on the "Scrophulariaceae of the Rocky Mountains," and this deals mainly with the western penstemons. This can be purchased for a small sum from the Smithsonian Institution,—or at least it could before the war.

Probably during his lifetime the writer has raised scores of western penstemons, most of which have gone to the great beyond. Hence it would be misleading to describe a larger number of beautiful penstemons, which might induce readers to try some of them with very doubtful success. For example, it has been my experience that some of the lovely plants found in the northwest, like *P. Scouleri*, *Newberryi*, *rupicola*, *Menziesii*, when brought east of the Mississippi, generally fade away in one season. The climatic conditions in the central states are so different from those of the northwest, that in general it is almost impossible to raise them.

There are however, a number of western penstemons that have survived in my garden for several years, and it is reasonable to suppose that people living east of the Mississippi could have equal success with them. It is these species only, that I have included in the following list.

Of the prostrate penstemons, suitable for the rock garden, I can claim long life for only one species, *P. Crandalli*, a native of Colorado. With its

delicate light sky blue flowers and tiny leaves, it is very charming, and in the course of time forms a good sized mat. Possibly there are other decumbent penstemons that are hardy in the east, and it would be interesting to hear if readers have had success with them.

P. procerus is another hardy plant suitable for the rock garden. In soil that is rather lean, it is no more than eight inches high. The bright violet purple flowers grow in thick clusters at the top of the stem.

The flowers of *P. confertus* have been described in two different colors: bluish purple, also light sulphur yellow. It has many characteristics of *P. procerus*, so that I am inclined to think that the form bearing bluish flowers must be a variety of *procerus*. At any rate, it is the plant with sulphur colored flowers that has endured in my garden for many years. Placed side by side with the violet *P. procerus*, and blooming about the same time, the contrast of colors is very pleasing.

P. angustifolius is found in Colorado and in neighboring states to the east. It is about a foot high, has narrow, grayish leaves, and fair sized, rather light bluish violet flowers. The color in different plants is rather variable, and I understand there is also a white variety. In Bailey's "Encyclopedia of Horticulture" there is a small picture of this species.

P. unilateralis varies in height from about one and a half to three feet.

It has good sized, rich violet blue flowers, and as its name would indicate, the numerous flowers tend to grow along one side of the stalk.

My *P. venustus* is hardly two feet high, although in its native habitat taller forms are sometimes found. It has sharply serrate leaves, and tends to form rather thick, erect clumps. One plant that I have, has purplish flowers, the other has a tinge of mauve mixed with the purple.

P. glaber and *subglaber* have many characteristics in common, and in a light, stony soil, are equally long lived. The seeds of *subglaber* were gathered in Utah a number of years ago, and I was fortunate enough to raise plants bearing flowers of several shades of violet, as well as some of a rich rose pink color. This species which is about two feet high, has good sized flowers, and is one of my favorite penstemons.

P. grandiflorus probably should not be included in this list, since it grows mostly on the high plains east of the Rockies, although it has been reported as growing in a few places in Colorado and Wyoming. Moreover, with me it is a biennial. However it comes so readily from seed, and has such remarkably large flowers that I always keep a number of plants on hand. The stem is stout, the leaves rather thick, and the lavender or pinkish flowers are fully two inches long.

ROBERT M. SENIOR.

CORRECTION

In the July, 1942, issue of THE NATIONAL HORTICULTURAL MAGAZINE, Dr. Stout published on behalf of the Lily Committee of the Society, Memo Re Nomenclature of Lilies.

In section III an error occurred in printing which we should like to ask all members to correct in their copies. For the word, *polyploid* as printed substitute *polybrid*.

Corrections are being made on all copies that leave the office.

A Book or Two

Fundamentals of Soil Science. By C. E. Millar and L. M. Turk. John Wiley and Sons, New York. 1943. 462 pages, illustrated. \$3.75.

That American college professors eventually write textbooks is almost axiomatic. This volume is primarily a college textbook, and one which is quite adequate and up-to-date in the field of soil science and pedology. The remarkable new developments in theory of climatic influences on soil formation which followed the pioneer work of Russian soil scientists of the recent past are included. This would be a useful reference book for the shelves of those whose interest in plant growing is more than superficial. It is written largely from an agronomic standpoint, however, and specialized groups such as florists, fruit growers, golf greenkeepers and ornamental gardeners will hardly find ready answers to their most pressing problems here. Genuinely adequate manuals of soil management for these specialized groups are difficult, if not impossible to find. Nevertheless, any plantsman would do well to learn the broad, general principles of soil science, and these are undeniably set forth clearly and accurately in this volume.

V. T. S.

Farming for Security. William B. Duryee. Whittlesey House, New York. 1943. 250 pages, illustrated. \$2.00.

Books of this type have been available since the days of Cato and Varro. Some have been propaganda and some have been highly useful. Some others

have been downright misleading. We admit spending an early youth largely on the farm and naturally approached this volume with some misgivings, which were quickly dispelled by the down-to-earth, commonsense approach of the author to his subject. The adjustment of city dwellers to rural living is frequently difficult and the author does not romanticize rural living unduly. Let us hope that the author is correct in his major thesis that rural living will provide a haven of refuge for the anticipated disorganized conditions of the post-war world.

Dr. Duryee is qualified to write on this subject by his practical experience with the type of farming described in the book and by his former tenure of the office of State Secretary of Agriculture in New Jersey. Naturally the book is related most closely to conditions in the more northern and less arid regions of the country. The treatment is concise and elementary rather than encyclopaedic. The lists of "Do's" and "Dont's" at the ends of the chapters are particularly helpful. The whole field of agriculture is covered in a brief survey, including selection of a farm, financing, engineering, poultry, dairying, horticulture and the others. This is a good first book for the city dweller who is becoming interested in rural living and is seeking sound information.

V. T. S.

Gardening for Good Eating. Helen Morganthau Fox. The Macmillan Co., New York. 1943. 262 pages, illustrated. \$2.50.

Eating has always concerned all mankind—good eating has often been a

major delight and preoccupation of many, and now, in these days of grace, of lack of it, it may take on new interests and meanings.

This book "is written for the person who does his own gardening and cooking in an intimate garden and small house or closely supervises it in larger quarters"—so begins the introduction; and one may well believe it, when one comes to the last page. Aside from small fruits, it keeps rather well within the reach of vegetables, taking that term in its broadest sense.

It is written by one who has studied, has gardened and has cooked, and having done all these things long enough, has finally written a book which stands quite apart from its nearest fellows in the field. It is packed with information, not only that which intrigues the mind, touches the acute palate and satisfies the stomach, but that also which pricks the spirit to new effort.

If you are already gardening, get it and read it for the new avenues it will open; if you are just beginning, thank Heaven you may read it and not follow the rut of old work; if you are cooking, follow it for variations it will offer; but even if you neither garden nor cook—or perhaps do not eat—read it anyway!

The Story of King Coffee. Costa Neves. Translated by Mary E. Garland. National Coffee Department of Brazil. 2nd Edition. 1942. Illustrated.

If one might accept the cover design as significant, this book is addressed to small children, children small enough to expect their willing or unwilling parents to read it aloud. Whatever the purpose, the fact remains that it is an entertaining book so that parents need not be too unwilling. It gives a great mass of historical data about a

beautiful plant that yields a delightful beverage and even more than that, it shows us how a plant from an obscure place has travelled over the earth and made its own conquests. It gives also, pleasant insights into the life and ways of our ally, Brazil, which may be more vivid to us, than reading about commercial treaties and trade relations.

Herbertia (Yearbook of the American Amaryllis Society). Vol. 9, 1942. 244 Pages, illustrated. Price \$3.25. Published by the Society, Winter Park, Florida. Editor, Hamilton P. Traub.

The somewhat indefinite group comprising the Amaryllidaceae and closely related families seems to grow endlessly with each new systematic rearrangement by the botanists. The present yearbook is the ninth of the series and is devoted primarily to the Alstroemeriaceae. A shift in editorial policy is discernible, since the varietal polls and discussions so prominent in recent issues have been reduced, doubtless a wise choice in view of the periods of sterility which have overtaken a few horticultural organizations due to excessive emphasis of varietal questions. Nevertheless, one may conclude that varietal studies are still a burning issue among the devotees of amaryllids. For example, one daylily breeder describes 40 new introductions of one season in this volume.

The strong emphasis on the technical aspects of one subject is shown by a number of botanical studies apparently preliminary to extended monographs of the groups involved, and also by several excellent articles on cytology and genetics. The summary of the work of Prof. Abilio Fernandes on the cytology of *Narcissus* and a paper on the inheritance of red flower coloration in daylilies by Dr. A. B. Stout both de-

serve particular mention. In these and other papers, the material presented is new and not available elsewhere.

The editor of a horticultural annual of this type does not have an easy task, for he must please the scientists, the commercial growers and the ordinary gardeners. Here the balance seems to be kept unusually well between these diverse interests. The plantsman will find much information of immediate practical application. The varietal discussions are generally conventional although one finds a polemic by Mr. Jan de Graff against the cult of extreme refinement in daffodils which seems to him to reach an apotheosis in the productions of several British hybridists. Being a very tolerant soul we are quite satisfied to allow any one to enjoy, produce and sell the gargantuan trumpet varieties of the Olympia or Diotima type and the informal, wavy perianth types such as Sir Watkin and his clan. We are also willing to grant the same rights to the perfectionists and give thanks that we are not facing any sort of horticultural fascism in which one is compelled to like any particular type of thing.

To the reviewer, the most intriguing popular article was the recounting of garden experiences with different species of *Allium* by Mr. Bernard Harkness. We hope that before long an entire issue of *Herbertia* will be devoted to this exceedingly varied, but little appreciated group. A wealth of material here awaits the hand of the hybridist. There should be a large group of specialists in *Alliums*, but personally we shall feel grateful if a separate organization devoted to enthusiasts does not make an appearance.

V. T. S.

Trees and Shrubs for Pacific Northwest Gardens. John A. and Carol L. Grant. Frank McCaffrey, Dogwood Press, Seattle, Wash. 1943. 335 pages, illustrated.

Without a doubt it must be a relief to a Pacific-Northwester to have a book like this, of his own, about his own. It follows a more or less well known garden book pattern with the usual round of "instructive" opening chapters before settling down to the chapters of annotated lists that pass from brief paragraphs to somewhat extensive discussions.

The "jaded" or even the unjaded Easterner will find very little in this book to pique his envy. There are too few things we cannot grow and too many we can, not always well described. *Cornus kousa* and its variety are not properly compared with *C. florida* unless the West Coast does strange things to this latter. Here black locusts and honey locusts do not give the same aspect in the garden. Some flowering crabapples are left out that we think ought to be in—but who cares? There are some definite statements about moot points on cherries that we could quibble about and so on—Where one really begins to be envious and sad is when one comes to pages 198 and thereafter, with texts and pictures of rhododendrons that we do not do and never can have. We can snifle a little over the azaleas, foolishly maintained as such. Not enough is said about the hybrid brooms and of course, not a word about those from California! And so—and so—We hope the Grants will do it again and stress all the things that the northwest Pacific Coast can do and no one else can. Surely there must be such?

Gardener's Pocketbook

Spring in Dropmore

Spring has been slow in coming to us this year and many trees are not yet fully out in leaf. Coming after the worst winter we have ever experienced, we are just finding out the full extent of the winter's damage.

Picea pungens has suffered severely and many good-sized trees will be killed. *Pinus ponderosa* grown from seed collected near Medora, N. D., and Custer, Montana, and that reached a height of six feet have been killed outright. *Pinus sylvestris* from Finland and north Sweden have stood up well while some trees, from ordinary commercial seed, that managed to survive the hard winter of 1917-18 again browned considerably. Black Hills Spruce again stands out as one of our most reliable evergreens.

Among deciduous trees, the Manchurian *Ulmus japonica* (received from the U.S.D.A.) is quite uninjured and *U. pumila* from Harbin is also doing well. The ordinary form of *U. pumila* killed back quite badly. *Acer glabrum* from the hills just west of Cheyenne is alive to the tips (it is fully six feet high) while the Fernie and Cranbrook B.C. forms and that from Watertown, Alberta, killed to near the ground as usual. Larches have stood up well. We have *L. americana*, *europaea*, *dahurica*, *koreansis*, *kurilensis*, *occidentalis* and *sibirica*. *L. occidentalis* grown from commercial seed were not hardy but specimens I collected from Canal Flatts in B.C. are apparently quite hardy.

I was successful in raising a few hybrids between *L. kurilensis* and *sibirica* and in our plantations grown for

the seed of *sibirica* collected here, many are apparently hybrids between that species and *americana* and *europaea*. Only a small percentage of the *leptolepis* grown from commercial seed are hardy and as these hardy forms are near other species and will soon be bearing seed, I suppose that there will be hybrids among their seedlings also.

In poplars, both *Populus tristis* and *robusta* have come through uninjured and promise to be valuable trees for this section.

One of the interesting features of the past year's injury was that in many cases young trees suffered worst and that many young trees had their bark destroyed near ground level while above the 18 to 24 inch line the bark would be quite fresh and green. Of course as the season advanced, these green portions also turned brown.

F. L. SKINNER

Dropmore, Manitoba

Chlidanthus fragrans (see page 113)

A species bulb which I have been experimenting with for many years is the South American *Chlidanthus fragrans*. It seems that when this bulb is good, it is very good indeed and when it is bad it is horrid. With me it happens to be very good indeed. Not because I do anything for it but because it appears to like my casual offerings. Knowing this lovely thing had the reputation of being exacting, and, having friends in Southern California who had made intelligent efforts to satisfy its supposedly perverse cravings, I expected nothing—an attitude which I like because it is sometimes



Lester Rowntree

Chlidanthus fragrans

[See page 112]

rewarded by surprise. Every year my *Chlidanthus fragrans* has vouchsafed blossoms; glorious waxy four or five inch long trumpets of clear soft lemon yellow flaring to an ample three inches.

I think one thing that *C. fragrans* likes is its light soil; no doubt it also appreciates being on a slope. I know it does not resent the almost waterless summers and this preference to being dry during August and September may be one reason it complains in the summer-watered gardens of my friends. I am told that all commercial growers take their bulbs out in summer to cure.

The unsullied flower trumpets lean out from an erect cluster of narcissus-like leaves, always careful to keep their beauty framed and not mixed in with their foliage. There are usually two flowers on a stem, sometimes more, the second flower expanding just as the first has accomplished its unfurling, so that for several days the twins

(or triplets) are in good trim. Intense heat, almost unknown during the foggy Monterey Peninsula summer, unmans them but they brisk up again toward evening.

One thing I especially love about well-named *Chlidanthus fragrans* is its scent, which is narcissus overlaid with lemon verbenas. Another virtue to be extolled is the flower's lasting qualities when cut. But the thing which pleases me most is that on my hillside, where so many plants previously nurtured on blandishments perish, this choice bulb reseeds itself. Its offspring leap, erect and confident, from thyme mats, mingle with the vivid Princess blue of *Anagallis grandiflora* and appear among the helianthemums,—a fact which makes me think that it is not I who am doing the experimentation—it's *Chlidanthus fragrans* who is experimenting with me.

LESTER ROWNTREE.

Carmel, Calif.

Sir Isaac Newton Apple to be Represented by Grafted Offspring on the William Penn Home Grounds now being Restored.

Apple scions and a small grafted tree, believed to be direct descendants by grafting from the tree at Woolsthorpe Manor House in England, which was made famous by Sir Isaac Newton when he discovered the law of gravitation, have been assured to the Pennsylvania Horticultural Commission, Harrisburg, for use in connection with the restoration of the William Penn homestead north of Philadelphia. Stock has been promised in time for next season's use. It will come from the East Malling Research Station, NR. Maidstone, Kent, England, where scions were obtained and first used during the spring of 1940.

Mr. Ross Pier Wright of Erie, Pa., Chairman of the Commission, learned of the stock by following up a reference made by Sir Henry Dale, Fullerton Professor and Director of the Laboratories of the Royal Institution, London, and President of the Royal Society. This reference was in an address delivered by him, November 30, 1942, at a meeting held in celebration of the 300th anniversary of the birth of Newton, which was published in *Science* for January 8, 1943 (Vol. 87, No. 2506). In describing the home where Newton was born and where he grew up, Sir Henry stated that "in the little orchard (in the rear of the house, near Colsterworth on the Great North Road, some 6 miles south of Grantham) there is an old recumbent apple tree, which they will tell you, is descended by direct grafting from that which Newton saw."

Recent correspondence which has taken place between Mr. Wright, Sir Henry, and other English officials, reveals that the stock is unusually well

authenticated and also that, apparently, the British are as pleased at having the stock come to America for this commendable purpose as is the Commission in being able to obtain it.

C. A. REED¹

From the Midwest Horticultural Society!

Crataegus oxyacantha.

Hawthornes are becoming conspicuous features of the modern landscape, but too often these are American forms which have brilliant fruits. A plant that deserves to be used more in conjunction with the American species is the English haw which grows slightly taller and with a more distinct stem coloration and a more attractive foliage. Used in combination with the coarse textured native species excellent effects can be obtained. For striking flowers there is no hawthorne more beautiful than the double pink form of the English species, Paul's Double Scarlet thorn.

A sight that never fails to attract much attention is a planting of a Paul's Double Scarlet flanked by the white form with the planting running into native species.

Hawthornes as a group are very satisfactory in the Middle West as they can withstand the hot dry summers and the cold winters better than some of the other ornamentals. While the emphasis on these plants is deserved, let us not forget the English thorns in white and pink which can be grown side by side with our natives and which have a unique beauty and grace that can enhance our own species.

Aesculus hippocastanum.

The last few weeks have brought vividly to mind the beauty of the horse-

¹Associate Pomologist, Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, Department of Agriculture.

chestnut, *Aesculus hippocastanum*. To see these stately trees in flower is to think of a mammoth yule with white candles. An avenue of these is an unforgettable sight. In some parts of the Chicago region these trees were formerly extensively planted and the large size now makes them thrilling spectacles.

There seems to be a slowing up of the use of this plant within the last two decades, probably because of the slow growth and the difficulty of transplanting large sizes.

Even without the flowers the dark green foliage of the palmate leaves is attractive. In hot dry seasons the plant does tend to shed its leaves early, but as a lawn specimen or as a street tree this tree has a definite value for more than half of the season and is more desirable than some of the more widely planted species.

Kalmia latifolia.

The Mountain Laurel is seen most commonly in this region as the foliage part of artificial flowers. This interesting broad-leaved evergreen is perfectly hardy in this region and needs only an acid soil and possibly some slight shade in winter to prevent wind burn. The foliage is attractive at all seasons and the plant does not have the habit of curling the leaves during cold or dry weather. The flowers are quite beautiful and last a long time on the plant. While it might seem that such a common plant of the east should not need mention for the middle west yet the seeming scarcity of this plant in landscape and garden work would indicate the need for an evaluation of it. Undoubtedly this could be used for a texture and habit break in many of the rather uninteresting plantings of nar-

row-leaved evergreens that are so much the fashion.

Philadelphus Virginalis.

Mock-oranges are rather conspicuous plants in most gardens in this region. However, the great majority of these plantings consists of the old large growing *P. grandiflora* which generally attained a height of nine to ten feet and a width nearly equaling the height.

The Virginal mock-orange \times *P. Virginalis*, is a lower growing shrub which rarely exceeds eight feet in height, and which is generally more upright and less arching than the *grandiflora*. In *Virginalis* the flowers are semi-double and produced in profusion even on small plants.

The flowers of *P. grandiflora* are only faintly fragrant while those of *Virginalis* are much more so but not quite as pronounced as the fragrance of *P. coronarius* which is less commonly seen here.

In choosing mock-oranges for the garden, the ultimate size should be considered first as species and hybrids covering a wide range of sizes are available. Next the size and fragrance of the flowers should be ascertained, as there is little reason for planting *P. grandiflorus* when the extremely fragrant *P. coronarius* can be used in the same size range. There has been too little distinction made between mock-oranges except in size with the less desirable species and varieties being used when others could have been selected with more satisfaction.

The variety *Virginalis* has the habit of recurrent bloom. While the flowers that appear later in the season do not rival the mass of bloom in June yet they are a welcome addition to the shrub border.

ELDRED E. GREEN.

Green and White.

There have been other notes in this journal in times past about the beauty of the fancy-leaved caladiums but perhaps never before has the office enjoyed so much the tracery of green on the white tissue of their amazing leaves as through the trying hot days of the present season. A six-inch pot, bought at Easter time, sits in its jardiniere of pale yellow and the leaves, growing toward the light of the window, make a very curtain of cool pale light.

As they rise from the crown, curled on themselves they look quite green as if they would not ever turn white, but unfurling, the green keeps on the outer margin and the blade displays its white base with the network of the venation verdant as always.

When it came there was a single flower, like a ghost of some calla that could not open, but none have followed although there have been any number of leaves that have replaced the more fragile leaves first borne, fragile only because they had been nurtured in the softer, more evenly humid air of the greenhouse.

It is a nice plant to have since it accepts a casual sort of watering with only one proviso, that there should always be too much. One does not have to stop to consider the amount, one needs only to pour in more and still more, knowing that the saturated soil is to its liking.

It is a nice sort of thing, too, in that one does not mind that it grows always toward the window and presents its back to the view from within the room. One does not have to bother with the task of turning it about to keep some of the faces inwards, as one must do in keeping so many plants symmetrical.

There are many sorts, of course, in many patterns and in many colorations, some even as soft and tender as this of

mere white and green with almost ineffable pale pinks that suffuse the blade, but none others have been added this year.

If it has a rival in the plants that tolerate the window shelf with its cargo of city dirt and soot that comes in even in summer, it is the common green leaved white spotted *Dieffenbachia* that has been so easily available in the shops of late. Here again one has a perfect drunkard for water and another plant that can be kept in its glazed pot without a fear that it will not like the standing water. On those few days when one is in the office all day, it is a sort of game to fill the jardiniere and then see how soon it will be empty!

Unlike the caladium, this has a stem with leaves arranged spirally about it, so that the plant must be turned from time to time, to see to it that the leaves do not form a twisted mass. And unlike the caladium, its leaves are less translucent so that those which turn back into the shadow of the room are no less beautiful than those that reach across the window and admit the light through the whitish spots and marblings.

There are those, of course, who will have none of variegated plants, who feel a sense of ill-being in the particolored leaves. Perhaps this is as it should be, but it is hard to believe, when one looks up some sultry July afternoon and sees the bright light of the July sun, our very best here, filtered through the green and white of these patterns, with something of the same beauty that one finds in the dappled light of a deep woodland when the sunlight falls through the canopy above.

What may be the problem when the time comes to repot the plant and try to adjust its curving stem to another receptacle still awaits us. Meantime, the watering goes on in prodigal amount.

While it cannot rival either of the plants already mentioned, the old umbrella plant is not to be despised as a member of the office window shelf and makes a good member of this trio, since it too likes water in abundance, in fact can well be kept almost submerged.

Our plant like many another in the garden world was grown from a leaf. With the leaf parts trimmed off, bobbed almost so that they would fit well into the jar, the leaf was submerged, in an inverted position and in no time at all there sprouted from each axil, a tuft of fine white roots and a bud that made a growing plant. When all were well under way, the whole was potted, so that the remains of the original leaf, both stalk and blades, might not rot away and leave the new plant.

The leaves, like all leaves, do not last forever, and the owner if he has ever known the itch that comes to propagators is likely to succumb to the idea of lopping off each leaf as it begins to show its weary yellow colors, trim it and set it in the way of becoming a new plant of its own. Some of ours have gone their ignominious way into the all-engulfing waste basket, some have found new homes and three, unneeded surely, are at this moment starting new plants that will soon be demanding soil and pots instead of the present liquid diet.

The leafy parasols are never quite the same size, nor do they form an even crown, but make a serried flight. At the moment a leaf green katydid is sitting in the center of the largest leaf, quite innocent to see, but the center of the next largest leaf is badly chewed.

There is not a tree in the block; not a green thing save the prisoners in windows like our own. How did he find us and where will he light next, since I have banished him to his translucent flight across the roofs that furnish the only horizon we can boast?

Mammillaria elongata

Whether one like to admit it or not, cacti as a group do not get enough light from a window like ours to make them really happy and their efforts to reach light bring about many abortions of their definitely characteristic body forms. Some of these new shapes are not too unlovely but others shame one.

The subject of this note has suffered us most patiently. It came from the nursery as a compact little group of three small branches, starred over with the radial yellowish spines. Now there are eight branches, all from so near the crown that they look like a tuft. Their diameter is a trifle less than that of their original but they are not yet "serpentine." They lean a bit toward the window but they do not writhe. And the new stars of yellowish white are so closely set over the green body that they remind one of the bits of coral that used to sit on the ancient whatnot in the corner of the then "parlor."

Although the texts say that the least excess of water will cause it to rot off, many of its fellows in the flat pan have gone that way and it has survived. A bona fide cactus lover would be sorry for it; but here where each green thing mitigates a city roof top scene, its tracery of spines that catch the varying lights from morning to evening make it one more bit of beauty for the day.

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4

